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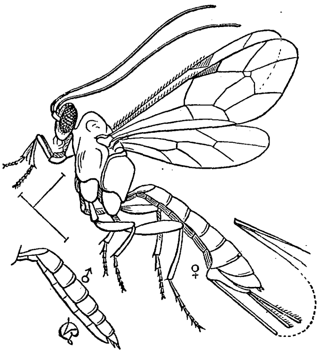
REVIEWS AND BOOK NOTICES.

Entomology in Missouri.*—Not only is this report of much interest to the farmers and gardeners of the State of Missouri, but naturalists will glean from its pages some facts new to science. We may congratulate the citizens of Missouri on the publication of an official report, which is of a high economical interest, and is an estimable contribution to science. And while thrifty habits are suggested, many a farmer's boy is acquiring an interest in insects and their ways, that will surely lead him to observe facts for himself in after life. His judgment will thus be trained, and he will be a better farmer and a more trustworthy citizen. Hence these reports have a distinctive educational and moral bearing on the citizens of the state in which they are published. We shall now attempt to give our readers some idea of the thoroughly good scientific work done by Mr. Riley in his primary attempt at enlisting the interest of agriculturists in observing and restraining injurious insects.

Fig. 115.



Pimpla, parasite of Codling Moth.

After some preliminary remarks on insects and economic entomology, with some views on classification to which we cannot give our assent,† several pages follow on the mode of collecting and preserving insects, with full illustrations.

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[*] Fifth Annual Report on the Noxious, Beneficial and other Insects of the State of Missouri, made to the State Board of Agriculture. By C. V. Riley, State Entomologist. Jefferson City, 1873. 8vo, pp. 160. With cuts.

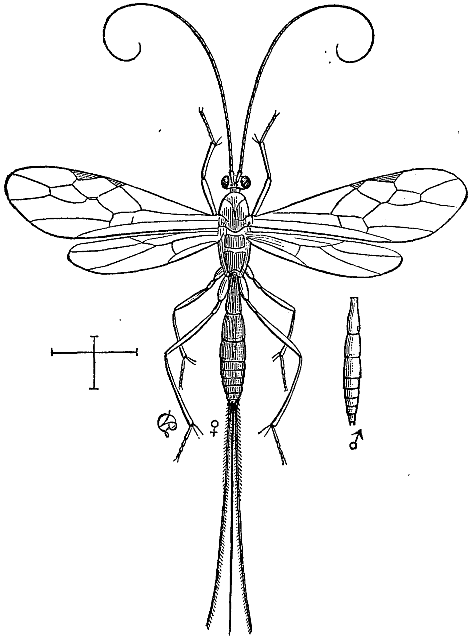
[†] For example, Rolleston was by no means the first to divide Articulata into Arthropoda and Vermes; it was done by Siebold in 1848, long before his work appeared.

As morphology indicates by the presence of four pairs of jointed appendages in the head, and embryology demonstrates by their early presence four rings in the head, our author's definition of an insect as 13-jointed does not express the whole truth. He should say 17-jointed, or 14-jointed, counting the head as one, in a popular report of this sort. Four rings can be demonstrated in the head of an insect as easily as that the petals of a flower are modified leaves. Mr. Riley also takes a back step in classification in separating the Strepsiptera from the Coleoptera, the fleas from the Diptera, and the Thysanoptera from the Hemiptera. It is strange if over thirty years of observa-

Two ichneumon parasites (Fig. 115, *Pimpla annulipes* Br. and Fig. 116, *Macrocentrus delicatus* Cress.) have been discovered attacking the codling moth, while ants, cockroaches, and the larvæ of certain predaceous beetles (*Trogosita nana*, etc.), play no unimportant part in destroying the well known apple worms.

We have farther information concerning the grape Phylloxera. Mr. Riley offers the opinion that the mortality among the grape vines in this country for two or three years past may be due to this insect, and from the statements he makes we should judge that he is correct, and if so every vine grower must make himself as familiar with the habits of this insect as he now is with the manure he uses upon the vines, or the mode of training and pruning them.

Fig. 116.



Macrocentrus, parasite of Codling moth.

The Phylloxera is found as far west as Manhattan, Kansas, and as far south as Florida. In Europe it is spreading in Portugal and Switzerland, and in some parts of Germany, while in England it is doing serious injury to hot-house grapes. In France so threatening has it become that the French Academy of Science has a standing Phylloxera committee, and M. d'Armand, at one of its sittings, demanded that the premium of 20,000 francs, offered

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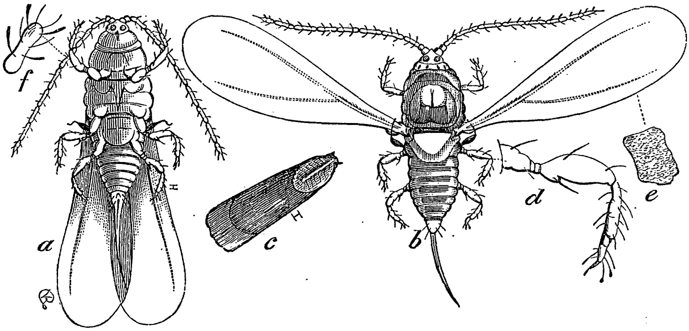
tion should not enable us to advance beyond Westwood's classification, admirable in 1840, but in many respects obsolete in 1873.

Again, our author states that embryological data "though of great value as pointing to the derivation of insects—their homologies and relations to the past—do not always subserve the best interests of classification." We would inquire what is classification but an attempt at tracing the genealogy of animals or plants?

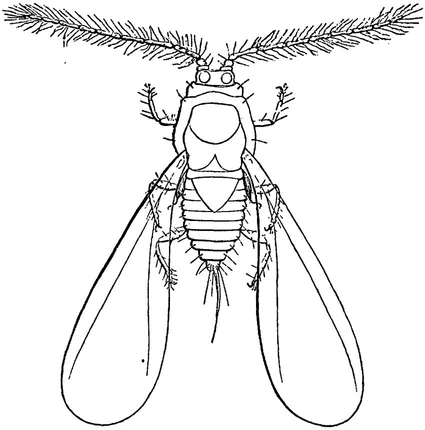
by the government for a remedy, be increased to 500,000, or if necessary to 1,000,000 francs.

Fig. 117.



Male of Apple bark Louse.

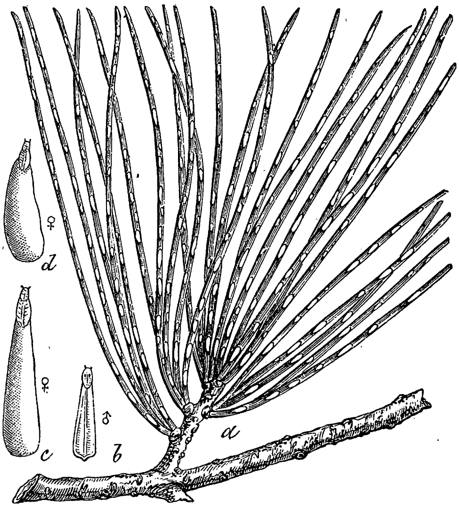
Fig. 118.



Male of Pine bark Louse.

The accompanying figure (117) represents the male of the apple bark louse, which Riley calls *Mytilaspis pomicorticis*, regarding it as distinct from the *A. pomorum* Bouché of Europe, from the fact that the eggs of the European species are reddish-brown, while those of our species are white. Care should here be taken in ascertaining how soon after being laid the eggs are observed, as they may vary in color with the age of the embryo within. Certainly we have been unable to detect any difference between the bark louse of the apple as we have observed it in Jena, Germany, and our species, having compared numerous specimens of both. Undoubtedly our species has been imported from Europe, and it would have been the better way, we think, to regard our species as identical with the *M. pomorum* (Bouché) than to give it a new name. The leaves of the white and other pines are sometimes so much affected by a long narrow bark louse, *Mytilaspis pinifoliæ* (Fitch), (Fig. 118 male, Fig. 119 *b*, the male scale, *c*, female scale on narrow leaved; *d*, variety on broad leaved forms of Pinus) as to kill the tree. The male (Fig. 118) differs from the male of the apple bark louse in being of a uniform orange-red. The species is double brooded, while the apple bark louse has but a single brood in a season. Drs. Fitch and LeBaron, as well as Mr. Riley, seem only to have found it on cultivated pines, but we have found it frequently in June of the present year on the leaves of the white pine at Brunswick, Maine.

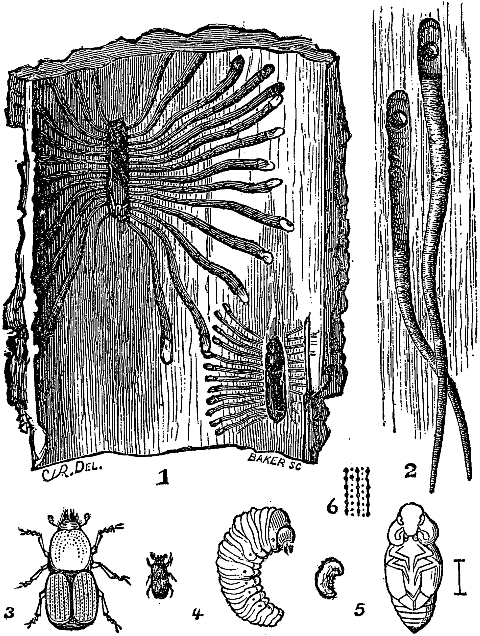
Fig. 119.



Pine bark Louse.

We then have an account of the habits and transformations of *Scolytus caryœ* Riley, the hickory bark borer (Fig. 120, 1, burrows of young larvæ, which afterwards run lengthwise along the bark 2; 3, beetle enlarged and of natural size; 4, larva; 5, pupa.) It infests the hickory, pecan and other species of Carya.

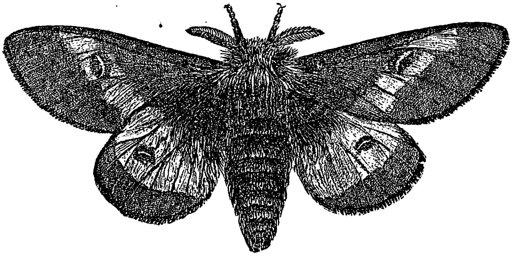
Fig. 120.



Hickory Scolytus.

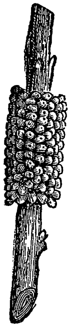
The chapter on stinging caterpillars is in the main corroborative of Mr. Lintner's interesting remarks on this subject. One of the most prominent of these larvæ is that of *Hemileuca Maia* (Fig. 121 male, Fig. 122, eggs, Fig. 123, larva, *b*, pupa, *c–g*, different spines). Another is the Io moth (Fig. 124 male, Fig. 125 female, Fig. 126 larva, Fig. 127 spines).

Fig. 121.



Hemileuca Maia.

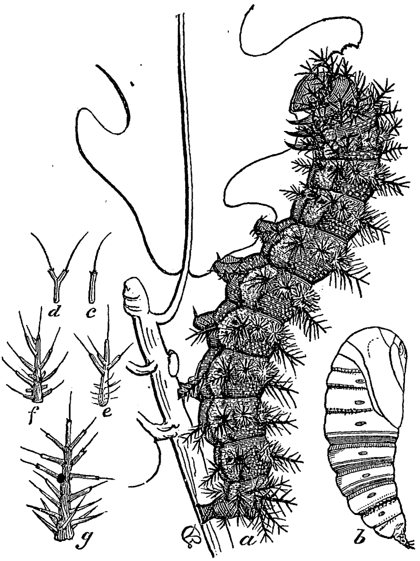
Fig. 122.



Eggs of Maia Moth.

Appended to the report is an article "On a New Genus in the Lepidopterous family Tineidæ: with remarks on the Fertilization of Yucca." This insect is called *Pronuba yuccasella*, and its appearance and structure may be learned from an examination of the annexed drawings (Fig. 128, *a*, larva, *b*, *c*, moth, *d–k*, head and details of larva; Fig. 129 shows the strange form of the head; *b*, maxillæ and their palpi, *e*, a scale, *f*, a leg, *g*, labial palpus, *h*, fore, *i*, hind wing; Fig. 130, pupa of male and female). Dr. Engelman had drawn attention to the fact that the yucca is incapable of self-fertilization, and Mr. Riley acquaints us with the yucca moth which effects it. He observed that at night "with her maxillary tentacle (Fig. 116), so wonderfully modified for the purpose, she collects the pollen in large pellets, and holds it under the neck and against the front trochanters. In this manner she sometimes carries a mass thrice

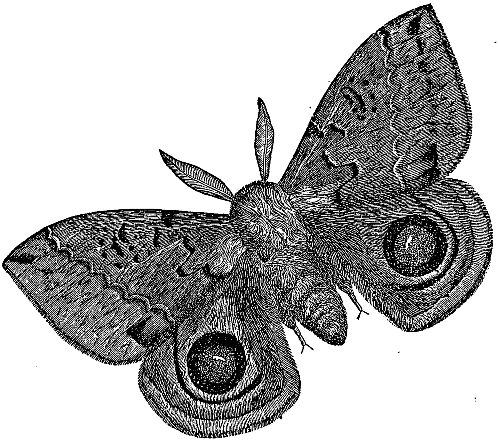
Fig. 123.



Larva of Maia Moth.

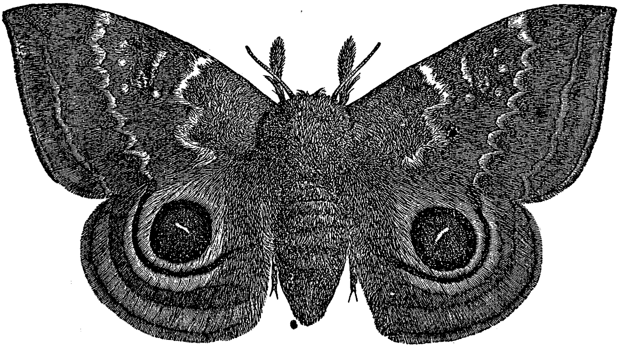
the size of her head (Fig. 129 *a*1). Thus laden, she clings to the top of the pistil, bends her head, thrusts her tongue into the stigmatic nectary, and brings the pollen-mass right over its mouth. In this position she works with a vigor that would indicate combined pleasure and purpose—moving her head and body from side to side, and apparently making every effort to force the pollen into the tube. Such is the method by which our yuccas are fertilized."

Fig. 124.



Hyperchiria Io male.

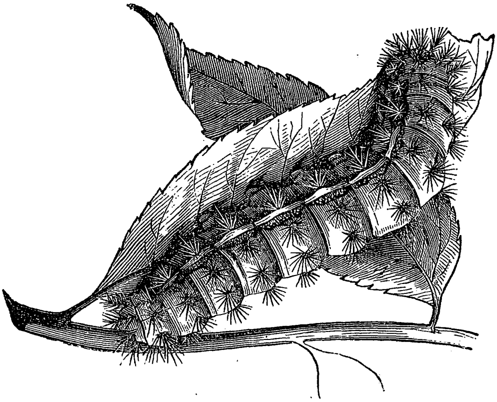
Fig. 125.



Hyperchiria Io female.

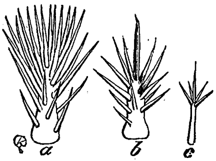
Riley thinks that the eggs are thrust into the fruit "from the side or from the stigmatic opening, following, most probably, the course of the pollen tubes." In a day or two after the flowers have withered the young fruit contains generally two young larvæ.

Fig. 126.



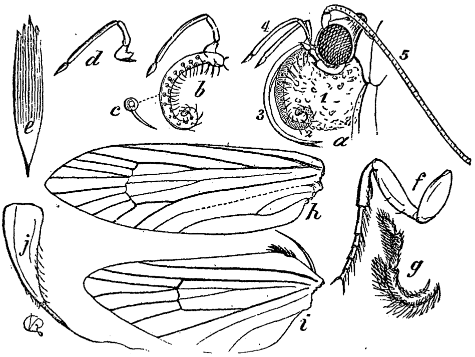
Larva of Io Moth.

Fig. 127.



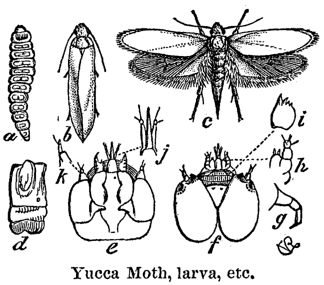
Spines of Io Moth.

Fig. 129.



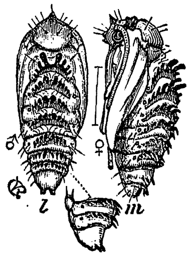
Yucca Moth, details.

Fig. 128.



Yucca Moth, larva, etc.

Fig. 130.



Pupa of Yucca Moth.

NOXIOUS, BENEFICIAL AND INJURIOUS INSECTS OF MISSOURI.